ONTARIO MINISTRY OF ENVIRONMENT
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OPERATING SUMMARY

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THE REGIONAL MUNICIPALITY OF

SUDBURY

TOWN OF

NICKEL CENTRE

CONISTON

WATER POLLUTION CONTROL PLANT

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MINISTRY OF THE ENVIRONMENT

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Coniston : water pollution control plant.

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Ontario

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ASSISTANT DEPUTY MINISTER
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REGIONAL OPERATIONS DIVISION

DIRECTOR, NORTHEASTERN REGION
R. Moore

MANAGER, UTILITY OPERATIONS
J. Wesno

CONISTON
WATER POLLUTION CONTROL PLANT

operated for

THE TOWN OF NICKEL CENTRE

by the

MINISTRY OF THE ENVIRONMENT

1974 ANNUAL OPERATING SUMMARY

prepared by

Plant Performance Unit

TECHNICAL SERVICES BRANCH

T. Cross, Director

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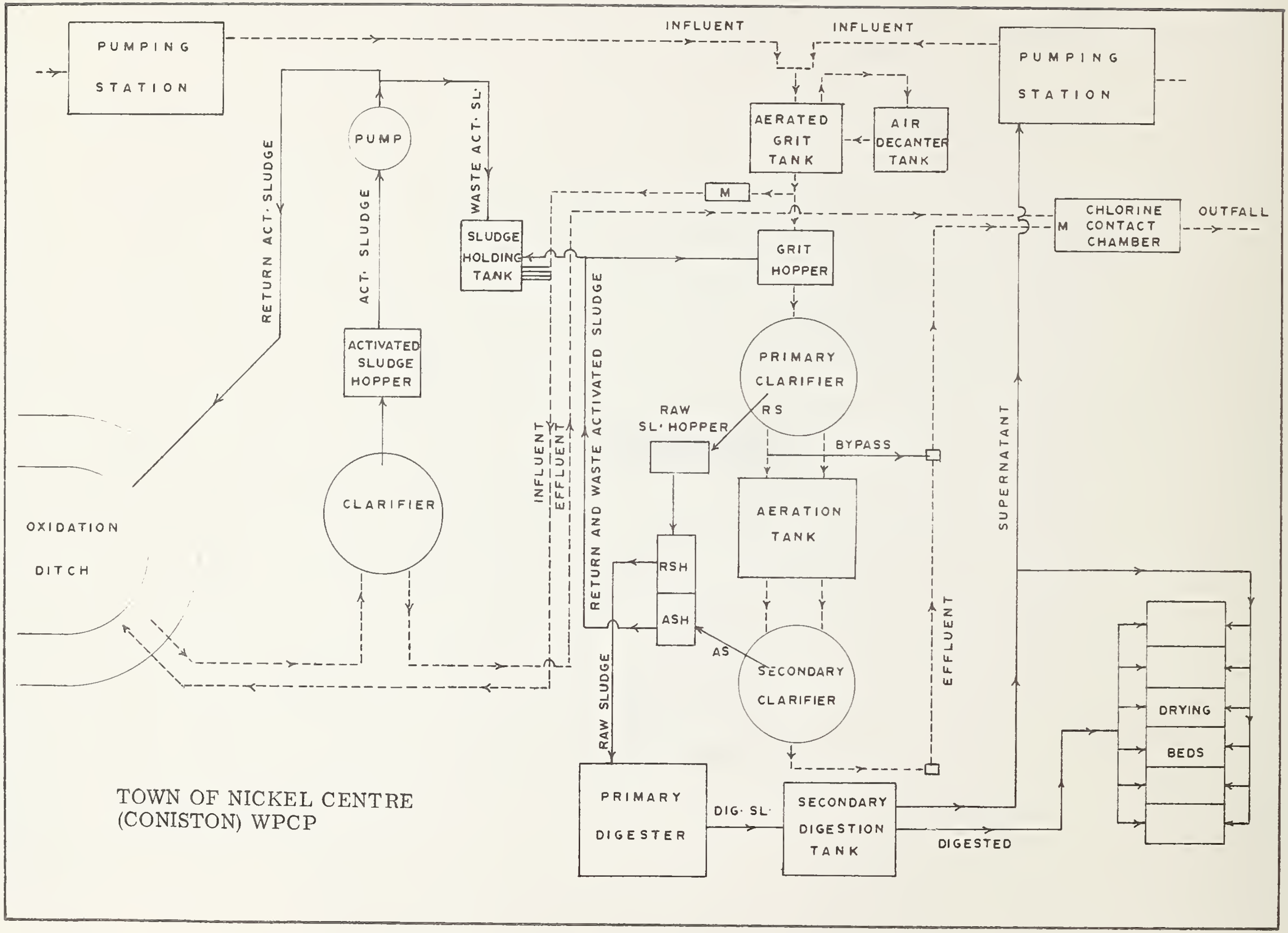


TOWN OF NICKEL CENTRE
(CONISTON) WPCP

DESIGN DATA

Project: Town of Nickel Centre (Coniston) WPCP

Project No: 2-0008-57

Treatment	Old Plant	New Plant
	Activated Sludge	Extended Aeration
Design Flow:	0.150 mgd	0.200 mgd

BOD - Raw Sewage 200 mg/l
Removal 93%

SS - Raw Sewage 250 mg/l
Removal 93%

PRIMARY TREATMENT

BAR SCREENS:

Two, in influent channels

AERATED GRIT TANK:

10' x 9.75' x 8.5' awd
Volume: 5,200 I. Gal. Detention: 21 min.

OLD PLANT

Primary Sedimentation

Type: Neco with helical scraper
Size: One 24' dia x 5.7' (18,400 gal) Retention: 2.94 hr.
Loading: Surface, 332 gal/ft^2/day (@0.15 mgd)
Weir, 1.700 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical aeration, single-pass
Size: one 29' x 29' x 15½' (55,800 gal) Retention: 9.3 hr.

Aerator

Type: Ames-Crosta Size: One 6' dia.

Secondary Sedimentation

Type: Ames-Crosta Type F Size: One 28' dia x 6½'
Retention: 4 hr.
Loading: Surface, 572 gal/ft^2/day(@ 0.15 mgd)
Weir, 720 gal/ft./day

SLUDGE HANDLING

Digestion System

Type: Two-stage

Primary --
One concrete fixed roof octagonal tank with 12" Ames-Crosta screw pump

Size: 19' 3" x 14' swd (4640 ft^3 or 29,000 gal)

Secondary --
One concrete tank with plank roof
Size: 10' x 10' x 8' swd (920 ft^3 or 5,700 gal)

Drying Beds

Six beds 20' x 30'

OUTFALL

- 10" Transite to creek

NEW PLANT

OXIDATION DITCH:

Capacity: 200,000 I. Gal.
Detention: 24 hours
Operating Depth 5 ft.

Rotor: Two, 8'2" width, each powered by 10HP motor.

CLARIFIER:

30' dia. x 8' awd
Volume: 35,000 I. Gal. Detention: 4.2 hours
Overflow Rate: 280 I. Gal/ft^2/day

SLUDGE HOLDING TANK:

12.9' x 11' x 12.9' awd
Volume: 11,000 I. Gal.

CHLORINE CONTACT CHAMBER:

Four passes, each 15' x 2.5' x 7.75' awd
Volume: 7,200 I. Gal.
Detention: 30 min.

CHLORINATOR:

Type: Fisher and Porter

'74 Review

GENERAL

The Coniston W. P. C. P. consists of a conventional activated sludge plant and an extended aeration plant utilizing an oxidation ditch with capacities of 0.15 million gallons per day and 0.20 million gallons per day respectively.

The digester screw mixer was completely overhauled. Due to the high cost of replacement parts, the large screw mixer was manufactured by plant staff and only the cast iron parts were purchased from the equipment supplier.

The flow meter was suspected to be in error to some degree as the total flows did not correlate to the individual meters. Technical Services staff were contacted to conduct a complete recalibration of all meters and it was found that the total flow meter had an inherent error of approximately 25 percent due to excessive friction in the air bubbler tube. The flow error was further compounded by the fact that the meter was inadvertently calibrated in Imperial Gallons per day whereas the transmitter cams are calibrated in U. S. Gallons per day.

It should be noted that the total flow figures include all the raw sewage that receives secondary treatment plus any portion that is by-passed directly to the chlorine contact chamber.

The connected population was 2,678 and represents an average per capita flow of 116 gpd. This is based on an average estimated daily flow of 0.31 million gallons per day.

EXPENDITURES

The total operating cost for the year was $29,808 which represents an increase of 15.1 percent over the previous year.

PLANT FLOWS AND CHLORINATION

The estimated total flow for 1974 was 111.0 million gallons representing an average of 0.31 million gallons per day.

The final effluent was chlorinated from May to October. A total of 1720 pounds of chlorine was used at an average dosage of 2.6 mg/l.

PLANT EFFICIENCY

The average raw sewage BOD and suspended solids concentrations were 148 mg/l and 172 mg/l respectively. The average BOD and suspended solids concentrations in the final effluent were 24 mg/l and 17 mg/l respectively. The BOD and suspended solids effluent quality should be in the order of 15 mg/l for each. The low quality effluent was due to operating difficulties which were corrected by plant staff.

The BOD and suspended solids efficiencies were 84 percent and 90 percent respectively.

AERATION

Activated sludge: the average MLSS in the aeration tank was 3800 mg/l. The average F/M ratio was 0.09 pounds of BOD per day per pound of MLSS.

Oxidation ditch: the average MLSS in the oxidation ditch was 7400 mg/l. The average F/M ratio was 0.03 pounds of BOD per pound of MLSS.

SLUDGE DIGESTION AND DISPOSAL

Activated sludge process: an estimated 37,000 gallons of raw sludge were pumped to the digester and 11,000 gallons were removed after digestion to the sludge drying beds.

Oxidation ditch process: approximately 200,000 gallons of waste activated sludge were removed from the holding tank during the year.

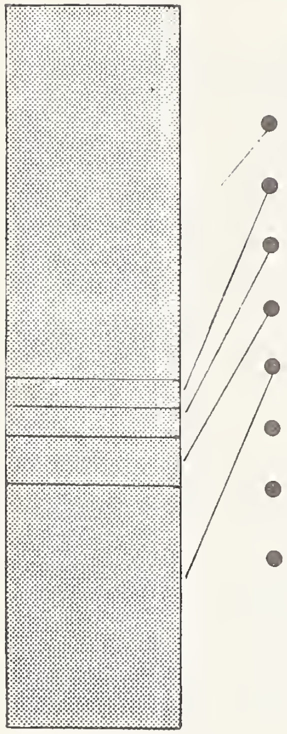
CONCLUSIONS

The low BOD and suspended solids efficiencies were due to in-plant process problems. The problems were corrected and the efficiencies are expected to be greatly improved in 1975.

The flow metering system is being carefully studied and steps will be taken to make the overall flow metering as accurate as possible.

ANNUAL COSTS

1974 OPERATING COSTS



● SALARIES & WAGES	51 %
● EMPLOYEE BENEFITS	4 %
● TRANSPORTATION & COMMUNICATIONS	4 %
● SERVICES	7 %
● SUPPLIES & EQUIPMENT	34 %
● AQUISITION/CONSTRUCTION OF PHYSICAL ASSETS	
● TRANSFER PAYMENTS	
● OTHER TRANSACTIONS	

YEARLY OPERATING COSTS

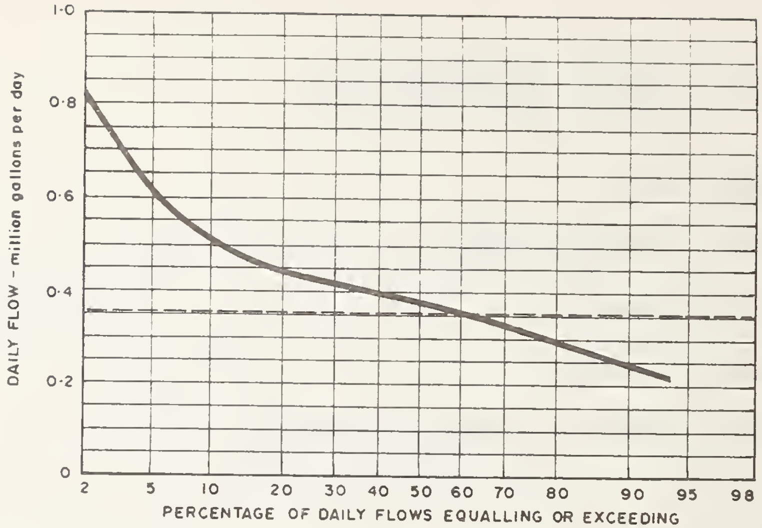
YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	UNIT COSTS	
			$/M G	¢/lb BOD
1969	70.2	18,073	257	13
1970	81.9	19,382	238	20
1971	81.0	20,012	246	17
1972	95.2	24,077	253	26
1973	158.0	26,069	164	10
1974	148.3	29,808	201	16

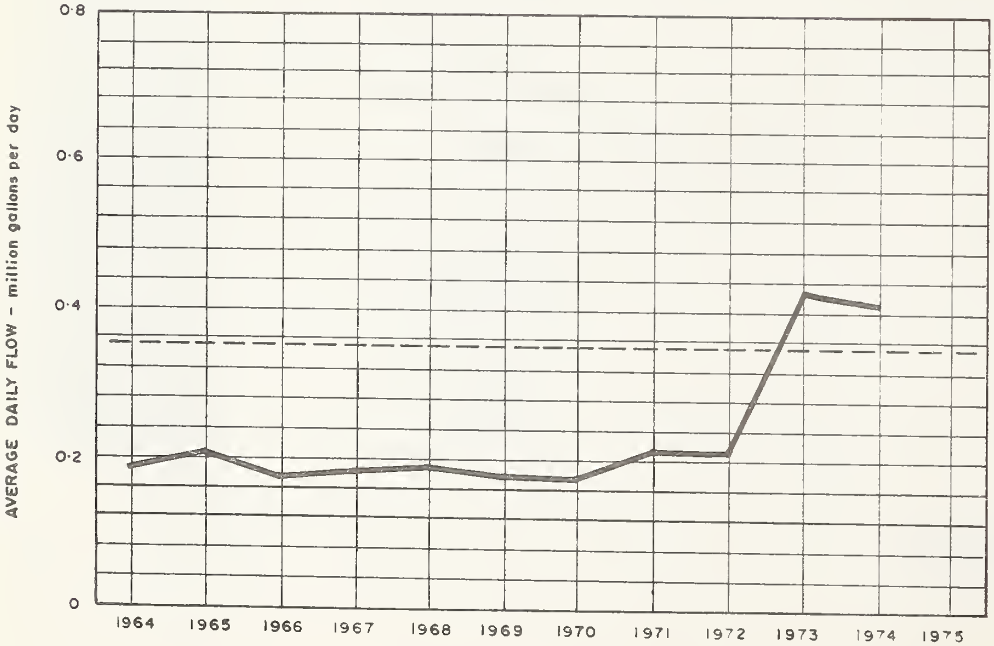
OPERATING EXPENDITURES

Regular Staff	$ 11,608	$
Casual (Unclassified) Staff	3,530	
TOTAL SALARIES AND WAGES		15,138
TOTAL EMPLOYEE BENEFITS		1,218
TOTAL TRANSPORTATION AND COMMUNICATIONS		1,206
Insurance	1,259	
Sludge Haulage	243	
Repairs and Maintenance	371	
Other Services	354	
TOTAL SERVICES		2,227
Machinery and Equipment	1,768	
Chemicals	844	
Utilities	5,826	
Other Supplies and Equipment	1,581	
TOTAL SUPPLIES AND EQUIPMENT		10,019
TOTAL AQUISITION/CONSTRUCTION OF PHYSICAL ASSETS		-
TOTAL TRANSFER PAYMENTS		-
OTHER TRANSACTIONS		-
GRAND TOTAL	GRAND TOTAL	$ 29,808

PROCESS DATA

FLOWS



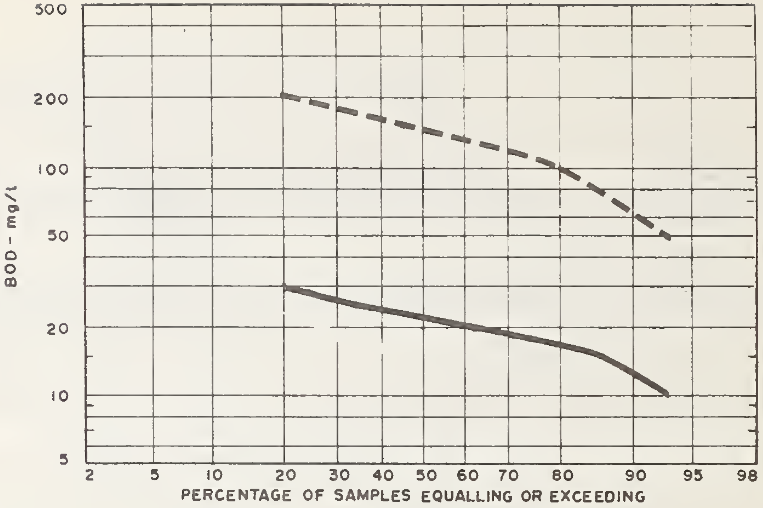


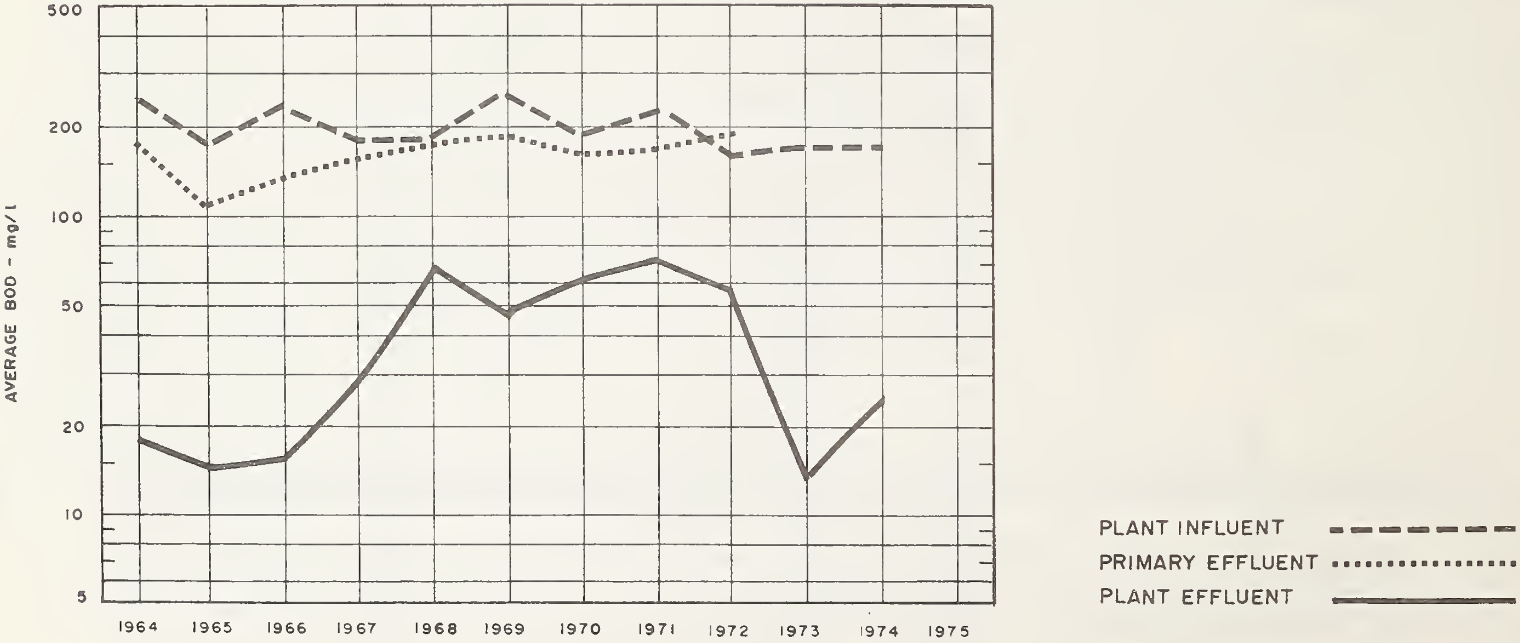
DESIGN CAPACITY - - - - - - -

PLANT PERFORMANCE

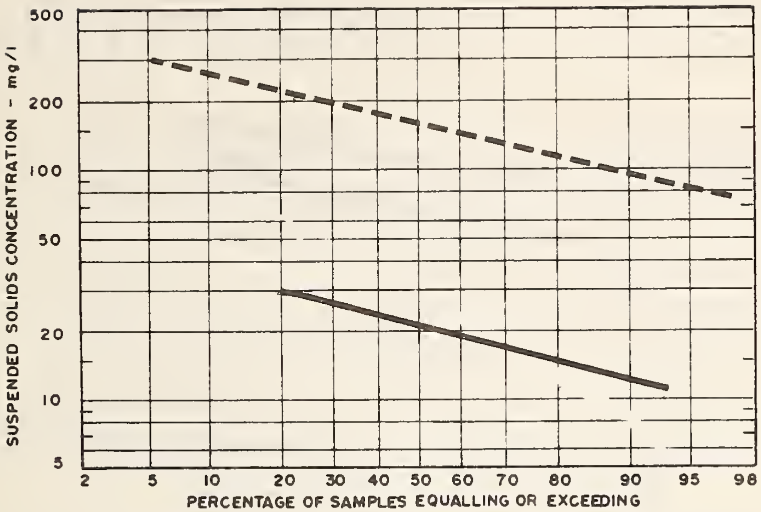
MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW million gallons	AVERAGE DAY mil. gal	MAXIMUM DAY mgd	INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l P	EFFLUENT mg/l P
						%	10^3 pounds			%	10^3 pounds		
JAN	12.3	.40	.53	108	34	69	9.1	167	16	90	18.5	4.5	3.0
FEB	10.0	.36	.41	145	23	84	12.2	150	9	94	14.1	5.6	2.2
MAR	15.0	.48	1.03	110	24	78	12.9	131	8	94	18.4	4.8	1.0
APR	17.8	.59	1.05	150	26	83	22.1	136	25	82	19.8	4.6	1.9
MAY	15.5	.50	.72	100	40	60	9.3	90	30	67	9.3	3.5	3.5
JUNE	13.0	.43	.65	140	26	81	14.8	315	20	94	38.4	5.4	2.9
JULY	10.7	.34	.48	130	12	91	12.6	201	23	89	19.0	5.0	5.5
AUG	8.5	.27	.34	250	16	94	19.9	220	20	91	17.0	7.6	3.1
SEPT	10.2	.34	.72	147	17	88	13.3	120	18	85	10.4	4.2	2.6
OCT	13.1	.42	.87										
NOV	13.6	.44	.79										
DEC	8.6	.28	.37	250	15	94	20.2	430	15	97	35.7	8.8	2.4
TOTAL	148.3	-	-	-	-	-		-	-	-		-	-
AVG.	12.4	.41	MAXIMUM 1.05	148	24	84	18.4	172	17	90	23.0	5.3	2.8
No. of Samples	-	-	-	13	13	-	-	31	33	-	-	12	12

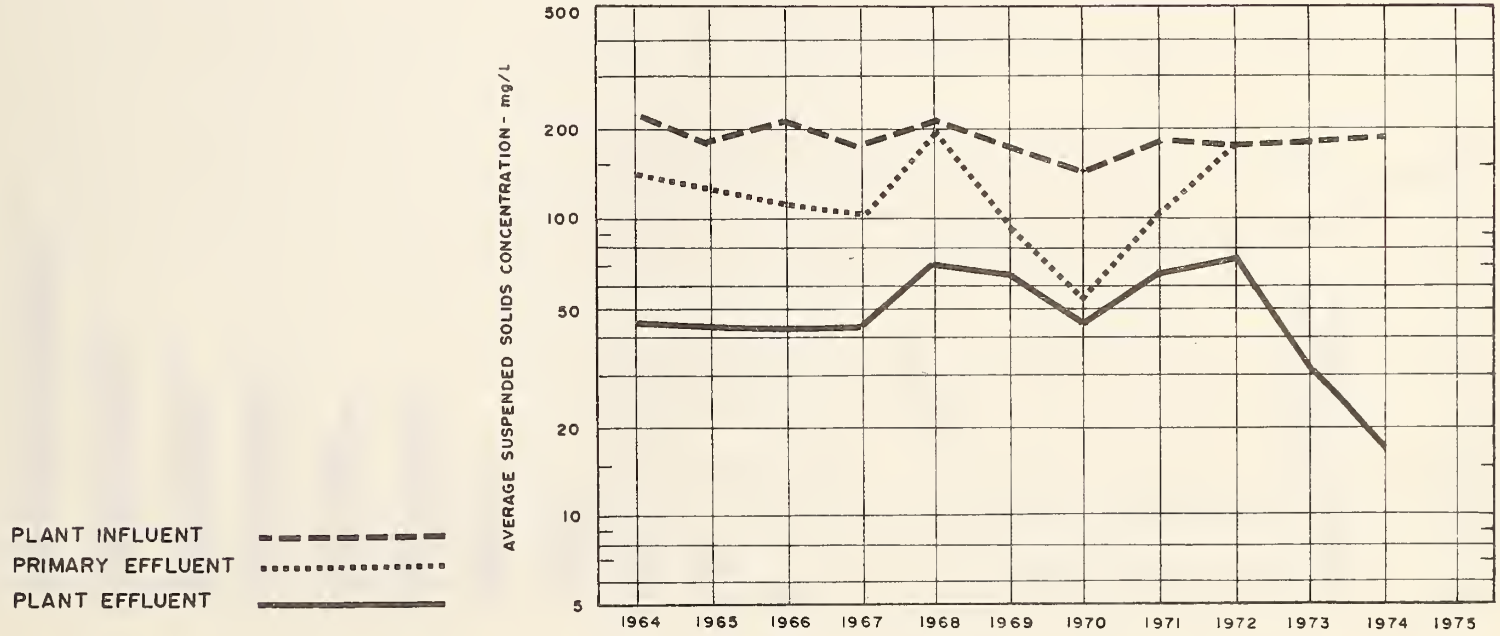
BIOCHEMICAL OXYGEN DEMAND



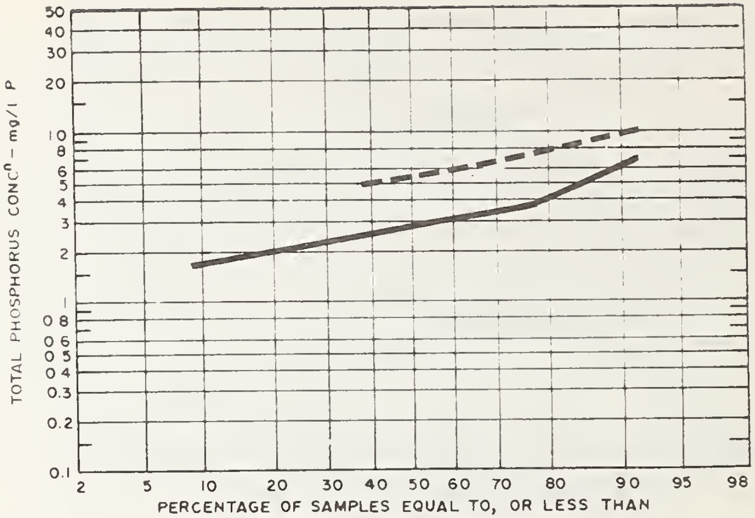


SUSPENDED SOLIDS

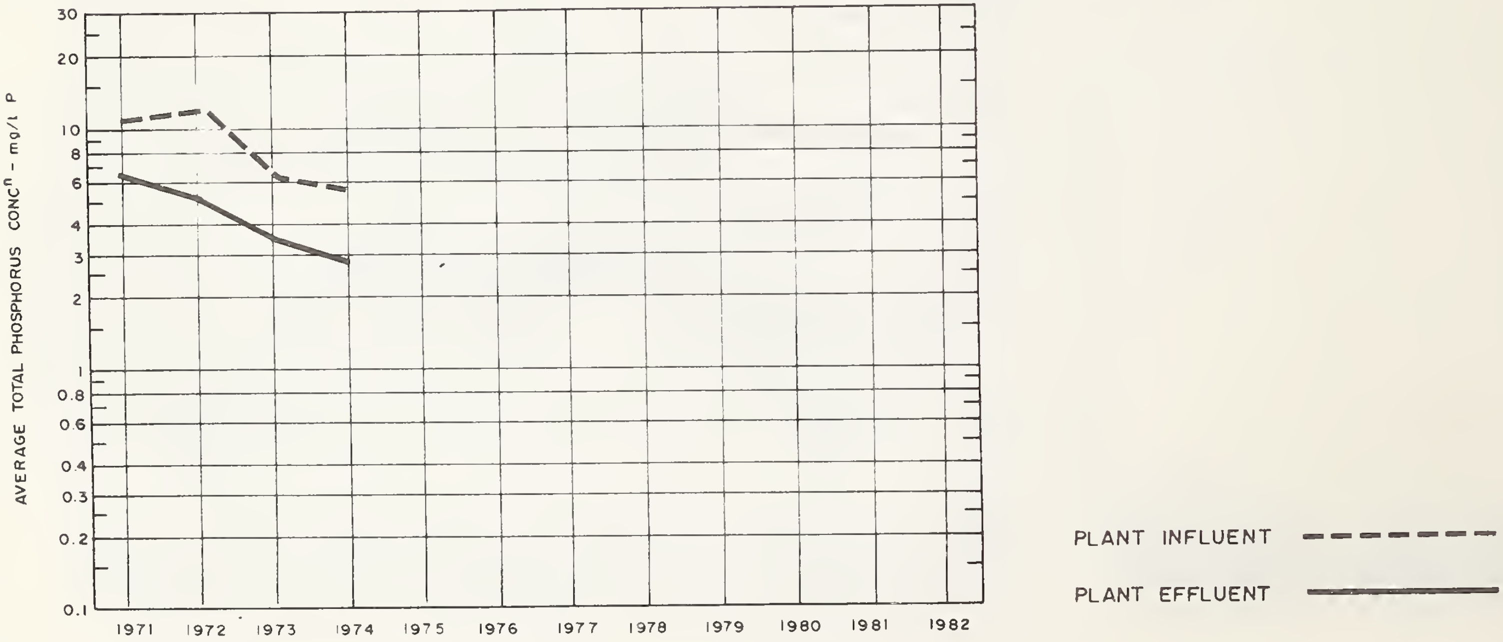




PHOSPHORUS

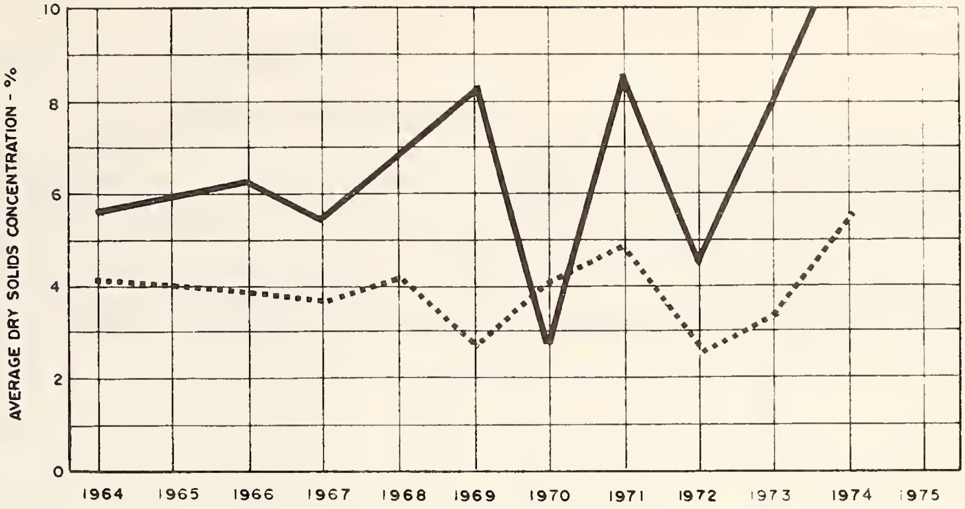


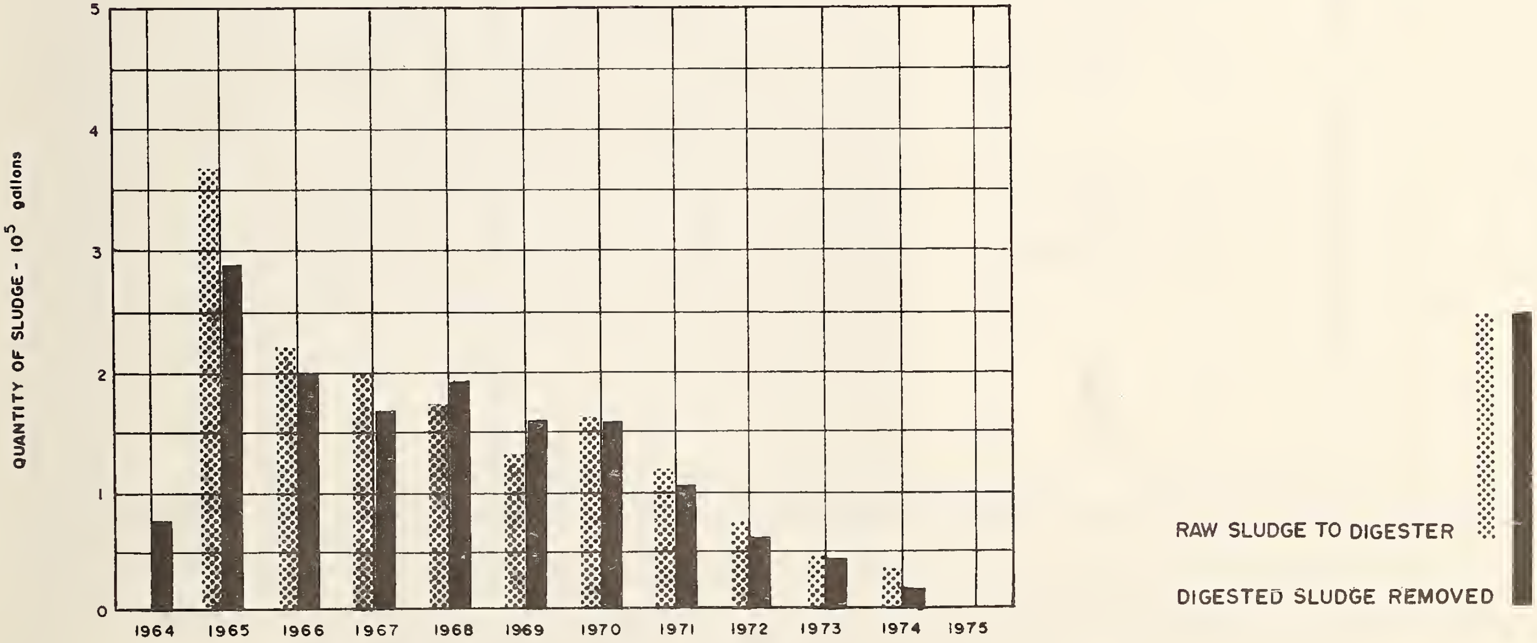
TOTAL PHOSPHORUS CONC^n - mg/l P
50
40
30
20
10
8
6
5
4
3
2
1
0.8
0.6
0.5
0.4
0.3
0.2
0.1
2
5
10
20
30
40
50
60
70
80
90
95
98
PERCENTAGE OF SAMPLES EQUAL TO, OR LESS THAN



AVERAGE TOTAL PHOSPHORUS CONC^n - mg/l P
30
20
10
8
6
4
3
2
1
0.8
0.6
0.4
0.3
0.2
0.1
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
PLANT INFLUENT
PLANT EFFLUENT

DIGESTION


RAW SLUDGE
DIGESTED SLUDGE
AVERAGE DRY SOLIDS CONCENTRATION - %
0
2
4
6
8
10
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975


QUANTITY OF SLUDGE - 10^5 gallons
0
1
2
3
4
5
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
RAW SLUDGE TO DIGESTER
DIGESTED SLUDGE REMOVED

OLD PLANT
TREATMENT DATA

MONTH	FLOWS	CHLORINATION		PRIMARY EFFLUENT		AERATION			SLUDGE DIGESTION and DISPOSAL							
									RAW SLUDGE			DIGESTED SLUDGE			SUPER-NATANT	
	MILLION GALLONS	Cl_2 USED 10^3 pounds	AVG DOSE mg/l	BOD mg/l	SUSPENDED SOLIDS mg/l	MLSS CONC mg/l	F/M day^{-1}	AIR $\frac{1000\ ft^3}{lb\ BOD}$	QUANTITY 10^3 gallons	TOTAL SOLIDS %	VOL. SOLIDS %	QUANTITY 10^3 gallons	TOTAL SOLIDS %	VOL. SOLIDS %	T. S. %	AMOUNT HAULED cubic yards
JAN	6.9				45	3900			3.1			.7				
FEB	4.6				62	3800			2.8	5.4	81		10.8	52	.1	
MAR	6.2				54	3500			3.4	2.0	73				.1	
APR	6.8				60	4100			3.0	6.6	72	.2	7.9		.1	
MAY	6.3					5300			3.2			3.4				
JUNE	5.1					3100			3.0	9.0		1.5	11.7			
JULY	4.6				97	2500			2.8			1.7				
AUG	4.6				79	3400			2.9	3.8		.5	20.0			
SEPT	5.4					3100			3.0			.6				
OCT	6.2								3.4			1.2				
NOV	6.2								3.3			1.2				
DEC	4.6			85	65	5900	.04		3.1							
TOTAL	67.5		-	-	-	-	-	-	37.0	-	-	11.0	-	-	-	
AVG.	1.8 cu. ft/mil gal			85	66	3700	.04		3.1	5.4	75	1.2	12.6	52	.1	

Estimating primary BOD reductions to be 30%, F/M ratio is estimated as 0.09 day^{-1}.

NEW PLANT

TREATMENT DATA

MONTH	GRIT	CHLORINATION		AERATION			WASTE SLUDGE			AEROBIC DIGESTER			
	QUANTITY REMOVED cubic feet	Cl_2 USED pounds	AVG. DOSAGE mg/l	MLSS. CONC mg/l	F/M day^{-1}	AIR USED $\frac{1000\ ft^3}{lb\ BOD}$	QUANTITY 10^3 gallons	SUSPENDED SOLIDS mg/l	VOL. SOLIDS %	QUANTITY REMOVED 10^3 gallons	SUSPENDED SOLIDS mg/l	VOL. SOLIDS %	AMOUNT HAULED cubic yards
JAN	121			4500	.04			11000					
FEB	103			5400	.03			8700	67				
MAR	160			5500	.04			10000	69				
APR	182			6100	.06			12000	65				
MAY	165	310*	2.0	6200	.03			12000	62				
JUNE	160	300	2.3	11200	.03								
JULY	195	300	2.8	8200	.02			13000	47				
AUG	160	320	3.8	10000	.02			15000	53				
SEPT	160	300	3.0	8800	.02								
OCT.	220	190	2.2										
NOV	130												
DEC	160			8600	.02								
TOTAL	2088	1720	–	–	–	–		–	–		–	–	
AVG.	14.1 cu. ft/mil gal		2.6	7400	.03			12000	61				

*Chlorination period: May 1 - October 19.

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Environment. Technical Services..
TD227/C66/W38/1974/MOE
Coniston water pollution plant.
Annual operating summary.

1974.

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